

What We Claim Is:

1. A system of electrically connecting a photovoltaic module, the photovoltaic module includes a plurality of photovoltaic cells and a frame mechanically coupling the plurality of photovoltaic cells, each of the plurality of photovoltaic cells receives solar energy and outputs direct current electricity, the outputs of the plurality of photovoltaic cells are combined and provided at a photovoltaic module positive and photovoltaic module negative nodes, the system comprising:

a wire assembly consisting essentially of:

a first wire extending between respective first and second ends, the first end of the first wire being electrically coupled to the photovoltaic module positive node;

a second wire extending between respective first and second ends, the first end of the second wire being electrically coupled to the photovoltaic module negative node; and

a third wire extending between respective first and second ends, the first end of the third wire being electrically coupled to the frame of the photovoltaic module; and

a first plug connector including a set of terminals arranged in a relative pattern, the set of terminals consisting essentially of:

a first terminal electrically coupled to the second end of the first wire;

a second terminal electrically coupled to the second end of the second wire; and

a third terminal electrically coupled to the second end of the third wire.

2. The system according to claim 1, wherein the wire assembly comprises a sheath commonly encasing the first, second and third wires, and the first, second and third wires are electrically insulated from one another within the sheath.

3. The system according to claim 1, wherein the first plug connector comprises an electrically non-conductive first body supporting each of the first, second and third terminals.
4. The system according to claim 3, wherein the first terminal comprises one of a male prong and a female receptacle, the second terminal comprises one of a male prong and a female receptacle, and the third terminal comprises one of a male prong and a female receptacle.
5. The system according to claim 4, wherein the first, second and third terminals comprise first, second and third male prongs, respectively, the first male prong extending along a first prong axis, the second male prong extending along a second prong axis, and third male prong extending along a third prong axis, and the first, second and third axes being parallel.
6. The system according to claim 5, wherein the first and second axes define a plane, and the third axis is spaced from the plane.
7. The system according to claim 5, wherein the first body of the first plug connector comprises a base portion encasing and electrically insulating the electrical couplings of the first terminal to the second end of the first wire, the second terminal to the second end of the second wire, and the third terminal to the second end of the third wire.
8. The system according to claim 7, wherein the first terminal projects from the base portion a first length, the second terminal projects from the base portion a second length, and the third terminal projects from the base portion a second length.
9. The system according to claim 8, wherein the first and second lengths are substantially equal.
10. The system according to claim 9, wherein the third length is greater than the first and second lengths.
11. The system according to claim 8, wherein the body of the first plug connector comprises first and second tubes projecting from the base portion, the first tube extending at least the first

length along the first prong axis and surrounding the first prong, and the second tube extending at least the second length along the second prong axis and surrounding the second prong.

12. The system according to claim 11, wherein the first and second tubes comprises first and second gaps, respectively, the first gap being defined by a first annular space between the first male prong and a first inner surface of the first tube, and the second gap being defined by a second annular space between the second male prong and a second inner surface of the second tube.

13. The system according to claim 12, further comprising:

a second plug connector including an electrically non-conductive second body, a first female receptacle receiving the first male prong, a second female receptacle receiving the second male prong, and a third female receptacle receiving the third male prong, a first configuration of the first and second plug connectors preventing electrical communication between the first, second and third male prongs and the first, second and third female receptacles, respectively, and a second configuration of the first and second plug connectors permitting electrical communication between the first, second and third male prongs and the first, second and third female receptacles, respectively.

14. The system according to claim 13, wherein the second body comprises first and second recesses, the first recess surrounding the first tube in the second configuration of the first and second plug connectors, and the second recess surrounding the second tube in the second configuration of the first and second plug connectors.

15. The system according to claim 14, wherein the second body comprises first and second insulators, the first insulator surrounding the first female receptacle and extending in the first recess, the second insulator surrounding the second female receptacle and extending in the second recess, the first insulator being received in the first gap in the second configuration of the first and second plug connectors, and the second insulator being received in the second gap in the second configuration of the first and second plug connectors.

16. The system according to claim 15, wherein the first recess including a first depth at least as great as the first length, the second recess including a second depth at least as great as the second length, the first insulator extending a first distance approximately equal to the first depth, and the second insulator extending a first distance approximately equal to the second depth.

17. The system according to claim 14, wherein the second body further comprises an aperture through which the third male prong passes to engage the third female receptacle in the second configuration of the first and second plug connectors.

18. The system according to claim 13, further comprising:
a first junction box mechanically coupled to one of the first and second plug connectors.

19. 18, wherein the first junction box is mechanically coupled to one each of the first and second plug connectors.

20. The system according to claim 18, further comprising:
a second junction box mimicking the first junction box, and the first and second junction boxes being positioned at different locations on the photovoltaic module.

21. The system according to claim 20, wherein the first and second junction boxes being positioned at opposite ends of the photovoltaic module.

22. The system according to claim 18, wherein the first junction box is mechanically coupled to a sole first one of the first and second plug connectors and mechanically coupled to a plurality of a second one of the first and second plug connectors, and each of the plurality of the second ones of the first and second plug connectors are electrically connected to the sole first one of the first and second plug connectors.

23. The system according to claim 13, further comprising:
a lock preventing the first and second plug connectors from being reconfigured from the second configuration to the first configuration.

24. The system according to claim 3, wherein each of the first, second and third terminals comprise respective female receptacles.

25. A photovoltaic module for mounting on a structure, the photovoltaic module comprising:
first and second module faces and an edge that extends between the first and second module faces, the first module face receiving solar energy and the second module face being adapted to generally confront the structure;

a plurality of photovoltaic cells being commonly supported by a base, each of the photovoltaic cells converting the solar energy to electricity; and

a junction box supported on the base along the edge and shielding electrical couplings to the plurality of photovoltaic cells; the junction box including a first one of a male plug connector and a female plug connector, the first one of the male and female plug connectors being accessible from the first module face and being adapted to matingly couple with a second one of the male and female plug connectors so as to output the electricity from the plurality of photovoltaic cells.

26. The photovoltaic module according to claim 25, further comprising:

a manual attachment, the manual attachment being adapted to releasably secure the base with respect to the mounting element.

27. A kit comprising:

a photovoltaic module including:

first and second module faces and an edge that extends between the first and second module faces, the first module face receiving solar energy;

a plurality of photovoltaic cells being commonly supported by a frame, each of the plurality of photovoltaic cells receives solar energy and outputs direct current electricity, the outputs of the plurality of photovoltaic cells are combined and provided at photovoltaic module positive and photovoltaic module negative nodes; and

a junction box supported on the frame along the edge, the junction box shielding the photovoltaic module positive and photovoltaic module negative nodes; the junction box including a first one of a male plug connector and a female plug connector, the first one of the male and female plug connectors being accessible from the first module face; and

a wire assembly including:

a second one of the male and female plug connectors matingly coupling with the first one of the male and female plug connectors, the second one of the male and female plug connectors including a set of terminals consisting essentially of first, second, and third terminals.

28. The kit according to claim 27, wherein the wire assembly comprises a cable, the cable consisting essentially of:

a first wire extending from the first terminal and being electrically coupled to the photovoltaic module positive node;

a second wire extending from the second terminal and being electrically coupled to the photovoltaic module negative node; and

a third wire extending from the third terminal and being electrically coupled to the frame of the photovoltaic module.

29. A method of electrically connecting direct current components of photovoltaic system mounted on a structure including an alternating current electrical system, the direct current components of the photovoltaic system including a photovoltaic module including a frame, a photovoltaic module positive node and photovoltaic module negative node, the method comprising:

mounting the photovoltaic module with respect to the structure; and

electrically connecting without tools the photovoltaic module to another one of the direct current components.

30. The method according to claim 29, wherein the electrically connecting comprises coupling a plug connector to the photovoltaic module, the coupling consists essentially of:
- electrically coupling a first wire to the photovoltaic module positive node,
 - electrically coupling a second wire to the photovoltaic module negative node; and
 - electrically coupling a ground wire to the frame of the photovoltaic module.
31. The method according to claim 30, wherein the coupling comprises mechanically coupling the plug connector to the photovoltaic module.
32. The method according to claim 30, wherein the electrically coupling the ground wire to the frame of the photovoltaic module comprises grounding the frame of the photovoltaic module with respect to the alternating current electrical system.